DOCUMENT RESUME

ED 423 771 HE 031 617

AUTHOR Lau, Ivy Cheuk-yin; Yeung, Alexander Seeshing; Jin, Putai
TITLE Academic Self-Concept Structure of Higher Education Students.
PUB DATE 1998-07-00
NOTE 12p.; Paper presented at the Conference of the Higher Education Research and Development Society of Australasia (Auckland, New Zealand, July 7-10, 1998). For a related document, see HE 031 617.
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; Chinese; *College Students; Foreign Countries; Higher Education; Models; *Self Concept; Self Evaluation (Individuals)
IDENTIFIERS *Academic Self Concept; Hong Kong

ABSTRACT

The structure of academic self-concept of university students in Hong Kong (n=274) was examined using the English, math, school, and general self-concept scales of Marsh's Academic Self Description Questionnaire and an additional Chinese self-concept scale. Confirmatory factor analysis clearly defined the a priori factors, even when both verbal domains of English and Chinese self-concepts were included in the model. Results indicate the multidimensionality and domain specificity of academic self-concepts of students in higher education, a finding consistent with previous research with high school students. Using an even stronger construct validation approach by including English, math, and Chinese achievement scores in the models, there was further support for the multidimensionality of students' academic self-concept in that achievement scores were highly correlated with self-concepts in corresponding subjects but were either uncorrelated or correlated negatively with nonmatching subject domains. In the same model, the inclusion of Chinese (the native language of the students) and English (the major language of instruction) provided a particularly demanding test of domain specificity of academic self-concept. Findings suggest the need for considering this strong multidimensional nature in studies of higher education students' academic self-concept and other related constructs. (Contains 45 references.) (Author/DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 423 771

Academic Self-Concept Structure of Higher Education Students

Ivy Cheuk-yin Lau,
University of New South Wales

Alexander Seeshing Yeung
University of Western Sydney, Macarthur

Putai Jin
University of New South Wales

Paper presented at the Conference of the Higher Education Research and Development Society of Australasia in Auckland, New Zealand, 7-10 July 1998.

Abstract

The structure of academic self-concept of university students in Hong Kong (N = 274) was examined using the English, Maths, School, and General self-concept scales of Marsh's (1990b) Academic Self Description Questionnaire (ASDQ) and an additional Chinese self-concept scale. Confirmatory factor analysis clearly defined the a priori factors even when both verbal domains of English and Chinese self-concepts were included in the model. Results indicate the multidimensionality and domain specificity of academic self-concepts of students in higher education, a finding consistent with previous research with high school students. Using an even stronger construct validation approach by including English, maths and Chinese achievement scores in the models, there was further support for the multidimensionality of students' academic self-concept in that achievement scores were highly correlated with self-concepts in corresponding subject domains (rs = .73, .63, and .77, respectively) but were either uncorrelated or correlated negatively with nonmatching subject domains. In the same model the inclusion of Chinese that is the mother tongue of the students and English that is the major language of instruction in Hong Kong's higher education provided a particularly demanding test of the domain specificity of academic self-concept. The findings suggest the need for considering this strong multidimensional nature in studies of higher education students' academic self-concept and other related constructs.

HE 031 617

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
Ivy Cheuk-yin Lau
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

An understanding of students' academic self-concepts is becoming more and more of a vital concern in educational psychology because self-concept is found to possess a predictive, and in some cases, causal value over other educational outcomes. A growing body of research have unfolded the relationships of academic self-concepts with other forms of educational outcomes. For example, using longitudinal data, Marsh and Yeung (1997a) demonstrated that academic achievement has substantial effects on subsequent academic self-concept and that the effect was reciprocal in manner. Other studies have found academic self-concept to influence choice behavior in coursework selection (Marsh & Yeung, 1997b). Other studies (e.g., House, 1993) have also demonstrated the relationship of academic self-concept with achievement-related expectancies.

Contrasted to the traditional understanding of self-concept as being a single global composite, Shaveslon, Hubner and Stanton (1976) proposed a self-concept model that could be empirically measured and was characterised by its multifaceted and hierarchical nature. The Shavelson model posited a general self-concept at the apex of the hierarchy beneath which were academic and nonacademic self-concepts, and each was further divided into self-concepts in various dimensions. Subsequent studies on the Shavelson model led to a ground-breaking revision of the original model Marsh and Shavelson (1985). Using a confirmatory factor analysis (CFA) approach, they found that the correlation between Verbal and Maths self-concepts was near zero. Similar findings were also reported in other studies (e.g., Byrne & Shavelson, 1986; Marsh & Hocevar, 1985). From these repeated findings, it was evident that the Verbal and Maths self-concepts were uncorrelated and that they could not be combined to form a high-order Academic (School) self-concept. Thus, recent research on self-concept has focused on its multidimensional nature.

In order to investigate issues relating to self-concept, effective instrumentation that reflects the multidimensionality and domain-specific nature of self-concept is required (Byrne, 1984; Marsh, 1990a, 1993b; Marsh, Byrne, & Shavelson, 1988). Derived from the Shavelson hierarchical model of self-concept, Marsh designed and administered a series of age-relevant Self Description Questionnaires (SDQI, II, III) (1992a, 1992b, 1992c) and Academic Self-Description Questionnaire ASDQ (1990b). The SDQ instruments were constructed specifically to measure the multidimensionality of both academic and non-academic self-concepts, and the ASDQ was designed to measure the multidimensional academic self-concepts. The validity of these instruments has been strongly supported and accredited by recent research (e.g., Byrne & Shavelson, 1986; Marsh & Hocevar, 1985; Marsh & Shavelson, 1985; Byrne 1996) and has been extensively tested and supported in non-western cultures even with translated versions in different languages (Abu et al., 1997; Chung and Watkins, 1992; Faria, 1997; Watkins et al., 1995a, 1995b; Watkins et al., 1996a, 1996b; Watkins & Mpofu, 1994).

To support the multidimensional hypothesis, the factor structure has to demonstrate strong support for the convergent and discriminant validity in that academic and nonacademic self-concept should be distinct constructs. In general, researchers have found that academic achievement is more highly correlated with academic self-concept than with nonacademic self-concept (e.g., Byrne, 1984), and achievement and self-concept in matching academic domains are more highly correlated than in nonmatching academic domains. In support of the convergent and discriminant validity of the SDQ instruments, Marsh, Byrne, and Shavelson (1988) demonstrated that English achievement was more highly correlated with Verbal self-concept than with

BEST COPY AVAILABLE

Maths self-concept whereas maths achievement was more highly correlated with Maths self-concept than with English self-concept. It was therefore evident that the high correlations between achievement and self-concept in matching domains supported the convergent validity of the SDQ instrument whereas the low correlations between nonmatching domains supported the discriminant validity.

Research and studies in testing the multidimensionality of self-concept are voluminous and extensive. Nearly on all occasions, the multidimensionality has been supported and substantiated (e.g., Byrne, 1984, 1988; Marsh, Barnes, & Hocevar, 1985; Marsh and O'Neil, 1984; Marsh, Parker, & Barnes, 1985; Marsh, Relich, & Smith, 1983; Marsh, Smith, & Barnes, 1983). Besides the earlier work conducted, the multidimensional nature of student self-concept has been extensively substantiated across gender (Crain & Bracken, 1994; Marsh, 1987; Marsh, 1994) and age (Byrne & Gavin, 1996; Crain & Bracken 1994; Marsh 1994). Marsh's (1990b) ASDQ calls for future research to facilitate a better understanding of academic self-concepts from a multidimensional perspective. For example, Marsh (1992d) investigated the relationship between student academic self-concepts and achievement across eight school subjects and found that both constructs were very specific to particular subjects considered. Self-concept and academic affects have been found to be very domain-specific (e.g., Marsh & Yeung, 1996; Marsh & Yeung, 1997b). Whereas most of the previous studies were predominantly conducted and supported with high school students, the present study is an attempt to test the convergent and discriminant validity of a multidimensional academic self-concept factor structure among higher education students in a non-western culture. To provide a more stringent test of the model, two verbal domains (English and Chinese self-concepts in this case) were introduced in CFA models. Applying the CFA approach, it is possible to examine the construct validity of the higher education students' self-concept responses by including external criteria that are related to each construct it is designed to measure. This technique has been used to evaluate the validity of the SDQ instruments, including the recently developed Physical Self Description Questionnaire (PSDQ; Marsh, Richards, Johnson, & Roche, 1994). For example, Marsh (1996) demonstrated 11 well-defined factors using CFA with the PSDQ, and when external criteria (in this case physical measurements) were included in the model, correlations between physical scores and self-concept scores in matching domains were substantially higher than in nonmatching domains. The addition of external criteria to the traditional factor analytic approach provides a much more meticulous scrutiny of the construct validity of the responses. This method is being adopted in the analysis of the present study.

Method

Participants

321 students from one of the higher education institutions in Hong Kong participated in the survey. Students came from various disciplines of studies. The age of the participants ranged from 17 to 28. Due to missing data in the returned questionnaires, only 274 were used in the analysis.

The SDQ Measures

Four academic self-concept and one general self-concept scales adapted from Marsh ASDQ II (1990b) measured - English, Maths, Chinese, and School (Academic) self-concepts, and General self-concept (usually known as self-esteem). Each ASDQ construct consists of 6 items each being parallel across all the subject domains. Each item in the survey used an 8-point true-false response scale (1=definitely false to 8 definitely true).

BEST COPY AVAILABLE

Achievement Scores

External criteria in the form of achievement scores were used to impose a more stringent test of the construct validity. Except for the math achievement score which was a single indicator, both English and Chinese achievement scores were taken from two public examinations over a span of two years that students had to take prior to their entry to any higher education institutions in Hong Kong. These scores are the basis for the university selection in the country.

Statistical Analyses

To be consistent with the positively worded items, all negatively worded items were reverse scored. Analyses were conducted with item pair scores. The three item pairs of the five constructs and five achievement indicators produced a 20 x 20 covariance matrix which were then analysed in four CFA models. The workings of CFA and the use of item pairs were best explained and described elsewhere and are not further discussed in this paper (see Bollen, 1989; Byrne, 1988; Joreskog & Sorborm, 1993; Marsh, 1994; Marsh & O'Neil, 1984; also see Pedhazur & Schmelkin, 1991). The SPSS version of LISREL (Joreskog & Sorbom, 1988) was used to explore the various goodness of fit of models and the relations among constructs in the solutions. Taking the suggestions of Marsh, Balla, and McDonald (1988) and Marsh, Balla, and Hau (1996), the Tucker-Lewis index (TLI) was the central focus of the fit index of this study.

Results and Discussion

Preliminary analyses showed high reliability estimates for the four academic self-concept factors and the one General self-concept factor (alpha=.94, .91, .94, 91, .88, respectively for English, Chinese, Maths, School, and General self-concept). Table 1 presents the findings of the four alternative models tested. Model 1 posited three academic self-concept factors (English, Maths, School) and one General self-concept factor structure based on 12 item pairs. Model 2 extended model 1 by adding three achievement constructs, corresponding to the self-concept constructs. Model 3 added Chinese academic self-concept into the model, resulting in a four academic self-concept factors and 1 General self-concept factor structure. Model 4 further extended the structure of model 3 by including the achievement scores for Chinese, English, and maths, resulting in a 5-factor structure model.

As shown in Table 1, the solution of all the four models were proper. In all the models, TLI and RNI were >.9. Among the models, model 4 was of the most inclusive of the variables considered in this study. Because the patterns of al other models were similar, the following discussion concentrates on the solution of model 4 that is presented in Table 2. One of the basic requirements for the validity of the factor structure is the factor loadings. As can be seen from Table 2, the loadings of all the factors considered here are high and the items loaded on the a priori factors. The factor loadings range from .59 to .97, the lowest ones found to be associated with the negative items. The uniqueness of each item is generally small though significant. From the findings gathered, it is evident that the solutions support the construct validity of the four academic and one general self-concept factor structure model. It clearly reflects the multidimensional and content-specific nature of the academic self-concepts of bilingual higher education students even when the second verbal (Chinese) domain is added to the traditional self-concept model.

Further support for the multidimensional and domain-specificity of self-concept is clearly demonstrated especially with the introduction of external criteria in the model. Good validity of the

BEST COPY AVAILABLE

multidimensional ASDQ responses requires higher correlations between the academic self-concepts with the achievements in the matching domains than with the nonmatching ones; and also higher correlations of the achievements with School (academic) self-concept than with General self-concepts. Here, all external criteria indicators are more highly correlated with the self-concepts of their matching domains. For example, English achievement correlates highly with English self-concept (r=.73) but negatively with Chinese and Maths self-concepts (r_s=-.14 and -24, respectively). Similarly, Chinese achievement correlates highly with Chinese self-concept (r=.77) but not with English (r=.07) or Math (r=-.13) self-concept. In the same way, maths achievement correlates more highly with Maths self-concept (r=.63) than with self-concepts in the nonmatching curriculum areas (r_s=-.25 and -.15 for English and Chinese self-concepts respectively).

The correlations of the curriculum-specific self-concept constructs also revealed some interesting phenomena in the academic self-concepts of higher education students in Hong Kong. These students' English self-concept, when compared to their self-concept in their first language (Chinese) and to their Maths self-concept, exhibits a much higher positive and significant correlation with the School and General self-concept constructs (r_s=.61 and .64, respectively). Maths self-concept shows with a much lower correlation with School and General self-concepts, although statistically significant (r_s=.13 and .12, respectively). The most interesting is perhaps the correlation of the students' self-concept in their first language (Chinese) with School self-concept that exhibits a particularly low (r=.09), and statistically nonsignificant correlation coefficient, compared to the two other curriculum areas. However, the coefficient rises to a significant (r=.23) level when Chinese self-concept is correlated with General self-concept (or self-esteem).

Table 1 Goodness of Fit Summary for Alternative Models

Model	χ^2	df	RNI	TLI
1. Null model (12 items)	3442.66	66		
Eng,Mat,Sch,Gen factors	128.52	30	.971	.936
2. Null model (15 items)	4010.86	105		
Eng,Mat,Sch,Gen + achv scores	240.16	67	.956	.931
3. Null model (15 items)	4256.97	105		
Eng,Chi,Mat,Sch,Gen factors	254.26	62	.954	.922
4. Null model (20 items)	5130.85	190	-	
Eng,Chi,Mat,Sch,Gen + achv	411.59	125	.942	.912

Note: N = 274. The ASDQ factors were English (Eng), Maths (Mat), Chinese (Chi), School (Sch), and General (Gen) self-Concepts with 6 items in each scale forming 3 item pairs each. Model 2 used English and maths achievement scores as external criteria. Model 4 used English, Chinese and maths achievement scores as external criteria. RNI = Relative noncentrality index. TLI = Tucker-Lewis index.

BEST COPY AVAILABLE

Table 2

CFA Solution for 5 ASDQ Factors (Model 4) with 3 Exam Scores as External Criteria

	Mean	SD	Factor Loadings ENG	CHI	MAT	SCH	GEN	ENGA	CHIA	MATA	Uniq	Correlations between measured variables 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
English Self-Concept																														
1 ENG1	5.29	1.38	87*	0	0	0	0	0	0	0	25*	--																		
2 ENG2	4.66	1.44	95*	0	0	0	0	0	0	0	09*	83	--																	
3 ENG3	4.74	1.50	97*	0	0	0	0	0	0	0	06*	85	93	--																
Maths Self-Concept																														
4 CHI1	4.91	1.51	0	84*	0	0	0	0	0	0	29*	18	06	13	--															
5 CHI2	4.43	1.53	0	94*	0	0	0	0	0	0	13*	01	-01	02	80	--														
6 CHI3	4.95	1.52	0	92*	0	0	0	0	0	0	15*	14	10	14	78	86	--													
Chinese Self-Concept																														
7 MAT1	4.87	1.48	0	0	85*	0	0	0	0	0	27*	00	-07	-03	01	-01	03	--												
8 MAT2	4.34	1.69	0	0	98*	0	0	0	0	0	04*	-14	-14	-09	00	03	04	83	--											
9 MAT3	4.28	1.70	0	0	94*	0	0	0	0	0	11*	-19	-16	-11	-09	-03	-01	79	93	--										
School Self-Concept																														
10 SCH1	5.11	1.27	0	0	0	79*	0	0	0	0	37*	56	53	55	-00	-06	05	12	-02	-01	--									
11 SCH2	4.53	1.34	0	0	0	92*	0	0	0	0	15*	41	51	52	07	01	12	14	15	14	73	--								
12 SCH3	4.83	1.40	0	0	0	95*	0	0	0	0	10*	54	59	62	16	07	18	18	13	08	75	87	--							
General Self-Concept																														
13 GEN1	5.46	1.28	0	0	0	0	90*	0	0	0	19*	54	52	55	23	23	25	19	14	07	54	55	63	--						
14 GEN2	5.67	1.11	0	0	0	0	84*	0	0	0	28*	54	50	51	12	12	18	14	04	01	61	58	59	76	--					
15 GEN3	5.53	1.46	0	0	0	0	79*	0	0	0	37*	58	47	50	20	08	11	25	13	05	56	46	54	71	68	--				
Achievement																														
16 ENGA1	7.03	1.74	0	0	0	0	0	83*	0	0	31*	57	57	60	-04	-14	-07	-11	-14	-15	34	33	34	37	30	29	--			
17 ENGA2	7.99	1.81	0	0	0	0	0	82*	0	0	34*	56	58	58	-04	-15	-08	-16	-25	-24	30	17	29	29	24	25	68	--		
18 CHIA1	8.55	1.96	0	0	0	0	0	0	73*	0	46*	04	01	07	48	51	54	01	-02	-07	01	16	13	18	08	06	15	05	--	
19 CHIA2	6.65	1.81	0	0	0	0	0	0	59*	0	65*	07	02	04	40	38	43	-17	-16	-15	-11	02	01	-01	01	-08	09	12	43	--
20 MATA	7.75	1.95	0	0	0	0	0	0	0	1	0	-27	-22	-24	-18	-13	-13	59	61	59	-15	-06	-07	-09	-16	-05	-10	19	-07	-20	--

Factor Correlations

English self	--							
Chinese self	08	--						
Maths self	-12*	02	--					
School self	61*	09	13*	--				
General self	64*	23*	12*	71*	--			
English Achievement	73*	-14*	-24*	39*	42*	--		
Chinese Achievement	07	77*	-13	11	12	18*	--	
Maths Achievement	-25*	-15*	63*	-09	-12*	-17*	-17*	--

Note. N = 274. The five constructs were English (ENG), Chinese (CHI), Maths (MAT), School (SCH) and General (GEN) self-concepts inferred from 3 item pairs (1 to 3) each. English achievement was inferred from two exam scores (ENGA1 and ENGA2). Chinese achievement was inferred from two exam scores (CHIA1 and CHIA2). MATA = Maths achievement 1. Uniq = uniqueness. Parameters estimates and item correlations range from 0 to 1 but are presented without decimal points -- values of 0 or 1 were fixed in the definition of the model.
* p < .05

BEST COPY AVAILABLE

Consistent with the above findings, the correlation coefficients of English achievement with School and General-self-concepts are high (rs=.39 and .42, respectively), out-weighing those of Chinese and maths achievements (see Table 2). The results seem to suggest the bilingual higher education students in this sample identify their General and School self-concepts more closely with their English rather than Math or Chinese self-concepts and English rather than math or Chinese achievement scores. Whereas this prevailing association between School (Academic) self-concept and the dominant language of instruction (English in this case) in a higher education setting may not be too surprising, it will be interesting to see whether similar findings will replicate in bilingual educational contexts outside Hong Kong where English is also adopted as the medium for instruction and assessment in the academic setting. This particularly interesting phenomenon could be a unique consequence of the educational system of a country that has undergone over 100 years of colonial rule where English (though a second language) has become the most salient academic domain in the any educational setting.

In the present study, the CFA results have established two important dispositions: (a) They demonstrated the multidimensional and domain-specific nature of the academic self-concept structure of a group of bilingual higher education students, warranting the distinctiveness and validity of the five distinct constructs (English, Chinese, Maths, School and General self-concepts) considered in the study; and (b) they demonstrated the validity and the robustness of the responses to the ASDQ when administered to a group of bilingual higher education students in a non-western culture in that the instrument has accurately measured what it was designed to measure.

Summary

The results of this investigation contribute to the study of academic self-concepts of higher education students in the following ways. The ASDQ responses are reliable and valid not only for high school samples but also for students of higher education. The academic self-concept of higher education students should also be understood as multidimensional and domain-specific, as has been extensively tested and supported with high school populations. This study supported a model that posits five distinct academic factors: English, Chinese, Maths, School, and General self-concepts. The use of achievement scores as external criteria in testing the self-concept structure of the higher education students has further strengthened the convergent and discriminate validity of their self-concept responses. Particularly interesting are the findings that suggest a strong association of the students' general School self-concept and self-esteem with the dominant language of colonial education rather than with their mother tongue, a phenomenon that may be worth further investigation.

References

Abu, H., Maher, M., Aal, H., & Abdul, Q. A. (1997). Dimensionality and hierarchy of the SDQ in a non-western milieu: A test of self-concept invariance across gender. Journal of Cross Cultural Psychology, 28, 535-553.

Bollen, K. A. (1989). Structural equations with latent variables. New York: Wiley.

Byrne, B. M. (1984). The general/academic self-concept nomological network: A review of construct validation reaseach. Reiview of Educational Research, 54, 427-456.

BEST COPY AVAILABLE

Byrne, B. M. (1988). Measuring adolescent self-concept: Factorial validity and equivalency of the SDQIII across gender. Multivariate Behavioral Research, 23, 361-375.

Byrne, B. M. (1996). Measuring self-concept across the lifespan: issues and instrumentation. Washington, DC: American Psychological Association.

Byrne, B. M., & Gavin, D. A. W. (1996). The Shavelson model revisited: Testing for the structure of academic self-concept across pre-, early, and late adolescents. Journal of Educational Psychology, 88, 215-228.

Byrne, B. M., & Shavelson, R. J. (1986). On the structure of adolescent self-concept. Journal of Educational Psychology, 78, 474-481.

Crain, R. M., & Bracken, B. A. (1994). Age, race and gender differences in child and adolescent self-concept: Evidence from a behavorial-acquisition, context-dependent model. School Psychology Review, 23, 496-511.

Faria, L. (1997). Marsh's Self-Description Questionnaire III (SDQIII) - adaptation study with Portuguese college students. Social Behavior and Personality, 24, 343-349.

House, J. D. (1993). The relationship between academic self-concept and school withdrawal. Journal of Social Psychology, 133(1), 125-127.

Joreskog, K. G., & Sorbom, D. (1988). LISREL 7: a guide to the program an application. Chicago: SPSS, Inc.

Joreskog, K. G., & Sorbom, D. (1993). LISREL 8: Structural equation modeling with the SIMPLIS command language. Chicago: Scientific Software International.

Marsh, H. W. (1987). The factorial invariance of responses by males and females to a multidimensional self-concept instrument: Substantive and methodological issues. Multivariate Behavioral Research, 22, 457-480.

Marsh, H. W. (1990a). A multidimensional hierarchical self-concept: Theoretical and empirical justification. Educational Psychology Review, 2, 77-172.

Marsh, H. W. (1990b). The structure of academic self-concept: the Marsh/Shavelson model. Journal of Educational Psychology, 82, 623-636.

Marsh, H. W. (1992a). Self Description Questionnaire (SDQ)I: A theoretical and empirical basis for the measurement of multiple dimensions of preadolescent self-concept: A test manual and research monograph, Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992b). Self Description Questionnaire (SDQ)II: A theoretical and empirical basis for the measurement of multiple dimensions of preadolescent self-concept: A test manual and research monograph, Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992c). Self Description Questionnaire (SDQ)III: A theoretical and empirical basis for the measurement of multiple dimensions of preadolescent self-concept: A test manual and research monograph, Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992d). Content specificity of relations between academic achievement and academic self-concept. Journal of Educational Psychology, 84, 35-42.

Marsh, H. W. (1993a). Academic self-concept: Theory, measurement, and research. In J. Suls (Ed.), Psychological perspectives on the self (Vol. 4, pp. 59-88). Hillsdale, NJ: Erlbaum.

BEST COPY AVAILABLE

Marsh, H. W. (1993b). The multidimensional structure of academic self-concept: invariance over gender and age. American Educational Research Journal, 30, 841-860.

Marsh, H. W. (1994). Confirmatory factor analysis models of factorial invariance: A multifaceted approach. Structural Equation Modeling, 1, 5-34.

Marsh, H. W. (1996). Construct validity of Physical Self Description Questionnaire responses: Relations to external criteria. Journal of Sport and Exercise Psychology, 18, 111-131.

Marsh, H. W., Balla, J. R., & Hau, K. T. (1996). An evaluation of incremental fit indices: A clarification of mathematical and empirical processes. In G. A. Marcoulides & R. E. Schumacker (Eds.), Advanced structural equation modeling techniques (pp. 315-353). Hillsdale, NJ: Erlbaum.

Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indices in confirmatory factor analyses: The effect of sample size. Psychological Bulletin, 103, 391-410.

Marsh, H. W., Barnes, J., & Hocevar, D. (1985). Self-other agreement on multidimensional self-concept ratings: factor analysis an multitrait-multimethod analysis. Journal of Personality and Social Psychology, 49, 1360-1377.

Marsh, H. W., Byrne, B. M., & Shavelson, R. J. (1988). A multifaceted academic self-concept: Its hierarchical structure and its relation to academic achievement. Journal of Educational Psychology, 80, 366-380.

Marsh, H. W., & Hocevar, D. (1985). Application of confirmatory factor analysis to the study of self-concept: First- and higher-order factor models and their invariance across groups. Psychological Bulletin, 97, 562-582.

Marsh, H. W., & O'Neill, R. (1984). Self-Description Questionnaire III (SDQIII): The construct validity of multidimensional self-concept ratings by late-adolescents. Journal of Educational Measurement, 21, 153-174.

Marsh, H. W., Parker, J., & Barnes, J. (1985). Multidimensional adolescent self-concepts: Their relationship to age, sex, and academic measures. American Educational Research Journal, 22, 422-444.

Marsh, H. W., Relich, J. D., & Smith, I. D. (1983). Self-concept: The construct validity of interpretations based upon the SDQ. Journal of Personality and Social Psychology, 45, 173-187.

Marsh, H. W., Richards, G. E., Johnson, S., & Roche, L., et al. (1994). Physical Self-Description Questionnaire: Psychometric properties and a multitrait-multimethod analysis of relations to existing instruments. Journal of Sport and Exercise Psychology, 16, 270-305.

Marsh, H. W., & Shavelson, R. J. (1985). Self-concept: Its multifaceted hierarchical structure. Educational Psychologist, 20, 107-125.

Marsh, H. W., Smith, I. D., & Barnes, J. (1983). Multitrait-multimethod analyses of the Self Description Questionnaire: Student-teacher agreement on multidimensional ratings of student self-concept. American Educational Research Journal, 20, 333-357.

Marsh, H. W., & Yeung, A. S. (1996). The distinctiveness of affects in specific school subjects: An application of confirmatory factor analysis with the National Educational Longitudinal Study of 1988. American Educational Research Journal, 33, 665-689.

Marsh, H. W., & Yeung, A. S. (1997a). Causal effects of academic self-concept on academic achievement - structural equation models of longitudinal data. Journal of Educational Psychology, 89, 41-54.

BEST COPY AVAILABLE

Marsh, H. W., & Yeung, A. S. (1997b). Coursework selection: Relations to academic self-concept and achievement. American Educational Research Journal, 34, 691-720.

Pedhazur, E. J., & Schmelkin, L. P. (1991). Measurement, design, and analysis: An integrated approach. Hillsdale, NJ: Erlbaum.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept validation of construct interpretations. Review of Educational Research, 46, 407-441.

Watkins, D., Akande, A., & Mpofu, E. (1996a). Assessing self-esteem: An African perspective. Personality and Individual Differences, 20, 163-169.

Watkins, D., & Dong, Q. (1994). Assessing the self-esteem of Chinese school children. Psychological Review, 14, 129-137.

Watkins, D., Dong, Q., & Xia, Y. (1995a). Towards the validation of a Chinese version of the Self-Description Questionnaire I. Psychologia An International Journal of Psychology in the Orient, 38, 22-30.

Watkins, D., Juhasz, A. M., Walker, A., & Janvlaitiene, N. (1995b). The Self-Description Questionnaire-I -- A Lithuanian application. European Journal of Psychological Assessment, 11, 41-51.

Watkins, D., Kan, A.K.C., & Ismail, M. (1996b). The self-conceptions of Malaysian adolescents: Assessment and cross-cultural comparisons. Psychologia An International Journal of Psychology in the Orient, 39, 144-149.

Watkins, D., & Mpofu, E. (1994). Some Zimbabwean evidence of the internal structure of Self Description Questionnaire-I. Educational and Psychological Measurement, 54, 967-972.

BEST COPY AVAILABLE